IEEE P802.11
Wireless LANs

|  |
| --- |
| Minutes for the Extremely High Throughput (EHT) Study Group (SG) March 2019 Meeting |
| Date: 2019-03-12 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Dennis Sundman | Ericsson |  |  | dennis.sundman@ericsson.com |
|  |  |  |  |  |

Abstract

This document contains the meeting minutes of the 3 EHT SG sessions held in March 2019 IEEE 802.11 plenary meeting.

**Tuesday 12 March 2019, E Session**

**Introduction**

1. At 7:40 PM, the chairman, Michael Montemurro (BlackBerry), calls the meeting to order. Approximately 170 people in the room.
2. The chairman asks if there is anyone who is aware of any patent holder of potentially essential patents. Nobody speaks up.
3. Approve the minutes from the January session. The minutes are approved with unanimous consent.
4. The main activity for this evening is to go through the PAR and CSD comments received from the other groups.

**EHT PAR and CSD Comments, 11-19/0459r1**

1. Nikolich comments
	1. Various discussions and responses to the comments. Most discussion regarding whether and what numbers to put for throughput and latency figures in Section 5.5.
2. 802.21 comments
	1. Some discussions about what the scope is. Is more, or less, than what the scope states allowed?
3. 802.15 comments
	1. The comment concerns coexistence with other 802 standards. The discussions concern wether this is relevant for the PAR document.
4. 802.3 comments
	1. Nothing in particular discussed.

**Time’s up! We continue at 8:00 AM tomorrow.**

**Wednesday 13 March 2019, AM1 Session**

**Introduction**

1. Michael opens the meeting. Goes through the agenda. Around 150 people in the room. Michael explains that we must finish the responses to the comments of the PAR and CSD.

**EHT PAR and CSD Comments, 11-19/0459r1**

1. 802.3 continue with the comments.
2. Comments from 802.1
	1. Add text to the PAR addressing latency.
	2. Many discussions on how the phrasing of relation to time sensitive network (TSN) should be.

**At 8:50, recess for 15 minutes so that motions can be prepared.**

1. PAR Approval Motion. 11-19/0239r02.

Believing that the PAR contained in the document referenced below meets IEEE-SA guidelines,

Request that the PAR contained in11-18/1231r6 <<https://mentor.ieee.org/802.11/dcn/18/11-18-1231-06-0eht-eht-draft-proposed-par.docx> > be posted to the IEEE 802 Executive Committee (EC) agenda for WG 802 preview and EC approval to submit to NesCom.

Moved: Allan Jones, Seconded: Laurent Cariou, Result: Yes-No-Abstain: 77-0-0

**Motion passes.**

1. CSD Approval Motion. 11-19/0239r02.

Believing that the CSD contained in the document referenced below meets IEEE 802 guidelines,

Request that the CSD contained in 11-18/1233r6 <<https://mentor.ieee.org/802.11/dcn/18/11-18-1233-06-0eht-eht-draft-proposed-csd.docx> > be posted to the IEEE 802 Executive Committee (EC) agenda for WG 802 preview and EC approval.

Moved: Laurent Cariou, Seconded: Allan Jones- Result: Yes-No-Abstain: 87-0-0

**Motion passes.**

1. PAR and CSD Comment Responses (motion). 11-19/0239r02.

Move to accept <https://mentor.ieee.org/802.11/dcn/19/11-19-0459-02-0eht-eht-par-and-csd-comments.pptx> as the response to comments received on the EHT PAR and CSD documents received from IEEE 802.

Moved: Laurent Cariou, Seconded: Jon Rosdahl - Result: Yes-No-Abstain: 81-0-0

**Motion passes.**

**Continuation**

1. Michael brings up discussion on TG operation process. Should we cluster technical contributions based on their topics. How many topics do we have? Is this reasonable?

**C:** I think it is a good idea.
**C:** In the call for contributions you can address which topic the contribution concerns.
**C:** You could have a strawpoll on the 4-5 most important topics and see what the group believes.
**C:** Maybe it is too early to perform this careful allocation already.
**C:** There will be at most 4 slots in May, so we cannot have a large set of contributions.

**Presentations (9:28 AM)**

1. 11-18/1957r3, “Experimental Study of NOMA/SOMA in Wi-Fi” – Evgeny Khorov (IITP RAS)

**Summary:** Theoretical and practical results. Explaining how their NOMA scheme works – signal superposition of constellations. Use successful interference cancellation (SIC) to decode. With SOMA, SIC is not used in the decoder. This introduces limitations of the superposition possibilities. NOMA seems to provide improved performance in all scenarios (MCSs 0 and 6 and 0 and 4). Also, SOMA seems to provide improved performance in all scenarios. Here, the “best” choices of MCSs are chosen.

**C:** Have you looked at the scenario with MU-MIMO. I think NOMA and SOMA may not be needed.
**C:** We have OFDMA as another technique to split the power between users. It’s not clear there is any gain over OFDMA with NOMA/SOMA.
**C:** Can NOMA/SOMA work together with beamforming? Because if not I think it is a no-starter.
**C:** Response to the OFDMA comment. I believe that OFDMA gain is not so big. I believe it is easier to obtain this gain for NOMA/SOMA.
**A:** I think it should be fine.
**C:** One question about NOMA. You decode successfully, SIC. So if you cannot decode one of the stronger streams, wouldn’t that error propagate deeper in the successful decoding process?
**A:** Yes.
**C:** As a weak user. If there is a large difference in the power of the strong signal and weak signal. The implementation complexity for the SIC may become large.
**A:** The complexity does not depend on signal strength. For the weak user we don’t need to implement SOMA/NOMA at all. Only the strong STA needs that.

**Recess.**

**Thursday 14 March 2019, AM2 Session**

**Introduction**

1. The chairman reminds us to take attendance. Around 150 people in the room.
2. The agenda:
	1. Call to Order
	2. Process any follow-up on PAR/CSD review
	3. Technical presentations (see slide 9)
	4. Preparation for May 2019 Session
	5. Old Business
	6. New Business
	7. Adjourn

**Presentations**

1. “Selection procedure”, 11-19/358r0 – Alfred Asterjadhi (Qualcomm inc.)

**Summary:** Alfred describes the rules for which the TG shall operate in order to reach a draft amendment.

**C:** This document differs from the TGax in that it does not include the use case document and simulation evaluation.
**A:** Yes.
**C:** The PAR we have is quite thin. What do you mean when you refer to the scope of the PAR?
**A:** The numbers in the PAR.
**Chair:** It may be a good idea to run several parallell groups for different non-overlapping features.
**A:** Here I mention in general two groups, PHY and MAC. But what you say makes sense.
**C:** Can you go to 4.3. It sounds like the editor has a lot of freedom here using the word “guide”. 🡪 Document is updated to use the word “provide” instead of “guide”.
**C:** I would recommend an ad-hoc group that focus on low latency.
**Chair:** I have thought about this, yes.
**C:** Sometimes the specification framework document (SFD) can be very helpful. However, it has not worked so well when it has approved something which turns out to not be such a good feature. I would like to see something looser so that what is added in SFD is not necessarily included in the spec draft.
**A:** You can still remove things from the SFD by getting a 75% vote.
**C:** Can you go to the diagram. Based on that diagram, it looks like to me that once we start drafting the spec text, the spec framework document is frozen.
**A:** This is not the case, so you can maintain both these documents for some time.
2. “Time-Sensitive Applications Support in EHT”, 11-19/373r0 – Kevin Stanton (Intel)

**Summary:** Kevin is from the IEEE 802.1. They want to explain to us some things about real time applications (RTA) and time sensitive network (TSN) requirements. Single digits milliseconds as worst-case latencies.
TSN is a taskgroup in 802.1. It is operating on the Link Layer. Time synchronization, timeliness (bounded latency), high reliability. IETF DetNet is extending TSN capabilities to routers. How do we preserve the attributes from TSN over 802.11. They believe that to obtain something in this direction, we need to schedule the access in the network, i.e., managing the network. Proposing normal operation and managed operation.

**C:** It is not so easy to introduce a managed network. In fact, it is in some sense not allowed.
3. “Low latency streaming capability for game applications”, 11-19/430r0 – Kazuyuki Sakoda (Sony)

**Summary:** This presentation focuses on the video streaming for games. In a server-client situation, they believe server to client latency should be less than 100 ms in each direction. This leaves less than 10 ms for the wireless link. In a remote play gaming situation, they believe again that less than 10 ms for the wireless link is enough.
4. “Reducing Channel Access Delay”, 11-19/402r0 – Enrico Rantala (Nokia)

**Summary:** They propose to introduce a new feature in EHT to mitigate channel access delay, “multiple primary channels”. They have performed simulations on the feasibility of this.

**C:** In slide 9, do you think the AP and the STA have multiple radios or is it a single radio?
**C:** In your similations do you include both UL and DL?
**A:** Only DL.
**C:** Are you flexible in terms of which BW to use for each packet? If so, you need to maintain several buffers wilth multiple packets encoded for different BW.
**C:** If you have multiple STA operating under this assumption, wouldn’t we get the same problem that the STAs are grabbing the “white space”.

**EHT PAR and CSD Comments, 11-19/0459r1**

The chair announces that we are going to interrupt the regular schedule. We have forgotten one CSD comment and need to provide a response.

* Motion on PAR and CSD Comment Responses. p10 in 11-19/0239r04.

Move to accept <https://mentor.ieee.org/802.11/dcn/19/11-19-0459-04-0eht-eht-par-and-csd-comments.pptx> as the response to comments received on the EHT PAR and CSD documents received from IEEE 802.

Moved: Laurent Cariou, Seconded: Jon Rosdahl - Result: Yes-No-Abstain: 103-0-0

**Motion passes.**

* CSD Approval motion p11 in 11-19/0239r04.

Believing that the CSD contained in the document referenced below meets IEEE 802 guidelines,

Request that the CSD contained in 11-18/1233r7 <[https://mentor.ieee.org/802.11/dcn/18/11-18-1233-07-0eht-eht-draft-proposed-csd.docx](https://mentor.ieee.org/802.11/dcn/18/11-18-1233-06-0eht-eht-draft-proposed-csd.docx) > be posted to the IEEE 802 Executive Committee (EC) agenda for WG 802 preview and EC approval.

Moved: Laurent Cariou, Seconded: Allan Jones - Result: Yes-No-Abstain: 107-0-0

**Motion passes.**

**Resume the regular schedule.**

1. “MAC Architectures for EHT Multi-band Operation”, 11-19/360r0 – Sharan Naribole (Samsung)

**Summary:** They classify potential architectures for multi-band operation: Independent MAC, Distributed MAC, Unified MAC.

**C:** I have a question on slide 5. What do you mean by synchronous transmission?
**A:** We mean that if you want synchronous transmission, it can be obtained through this MAC.
**C:** Also, on slide 5, we already have something like this in the spec. Does this presentation bring anything new?
**A:** What is in the spec is a subset of what we propose here. But the point with the presentation is to show what sort of use-cases we can fulfil with the different designs.
**C:** It is probably a bit premature to discuss this already. I think it makes more sense to decide the architecture once we know what features we want.
2. “Feedback Overhead Reduction in 802.11be”, 11-19/391r0 – Kobe Oteri (InterDigital)

**Summary:** They want to look at how to reduce the overhead in channel training for 16 spatial streams (SS). They look at existing explicit and implicit feedback schemes, as well as new explicit feedback schemes. Essentially, they consider different sorts of compression for the feedback information.

**C:** How does it work with the two-way channel training?
**A:** You use the estimated channel as precoder when you reply with the training.
**C:** I’m wondering if the feedback overhead is an issue or not.
**A:** True, it may be useful to carry out such a study i.e. comparing current state of the art to some of these ideas.
**C:** You have to consider these things in terms of time. You can convey the feedback information with a higher rate if you have more antennas, therefore the time required is not necessarily large.
**C:** I have a comment on the differential Given’s rotation. Currently we do training on each subcarrier. Does this require serial or parallell processing on the subcarriers.

**We’re Ajourned!**